THE MULTIPLE INTELLIGENCES THEORY AND LANGUAGE LEARNING STRATEGIES: RELATION AND THE EFFECT OF INSTRUCTION

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Abstract

The present study was conducted to investigate the existence of a possible relation between multiple intelligences (MI) and language learning strategies (LLSs), and to find out whether explicit instruction in LLSs was beneficial for students. The instruments used to gather results were a MI test and the SILL (Strategy Inventory for Language Learning. Version for Speakers of Other Languages Learning English) to analyze the relation between MI and LLSs, and a pre test, two immediate post tests and a delayed post test to study the effectiveness of strategy use. The results revealed a correlation between MI and LLSs, and benefits in the explicit instruction of LLSs for vocabulary learning.

I. Introduction

Education, though at a slower pace than other aspects of society, has changed and evolved in the last decades. One of the most remarkable changes has been the shift from a teacher centered curriculum, where the teacher instructed the whole class in the same way, to a student centered curriculum, where "students exercise a substantial degree of responsibility for what is taught, how it is learned, and for movement within a classroom" (Cuban, 1993:7). This change has been due to the influence of other disciplines such as psychology, which, for example, has had a strong influence through its new interpretation of the concept of intelligence as multifaceted and fluid.

The concept of intelligence being multifaceted was defended by psychologists like Sternberg (1985, 1988, 1997) and Gardner (1991, 1993, 1997), who contemplated several types of intelligence. While the names given to different types of intelligence by these authors varied, educators, psychologists, and researchers alike shared the conception that we think, learn, and create in different ways and that the development of our potential is affected by the match between what we are learning and how we learn with our particular intelligences. The idea that intelligence is fluid had led to the belief that providing children with rich learning experiences would amplify their intelligence, and that denying them such richness of experience would diminish it (Caine & Caine, 1991 as cited in Tomlinson 1999:18).

Language Learning Strategies (LLSs) have also been subject to research during the last three decades. One of the major contributions of this line of research has been to identify the strategies used by good learners and to determine how these strategies could be conveyed to less successful students (Cohen, 1998; Hosenfeld, Arnold, Kirchofer, Laciura & Wilson, 1981; Naiman, Fröhlich, Stern & Todesco, 1978/1995; O'Malley, Chamot, Stewner-Manzanares, Küper & Russo, 1985a, 1985b; Oxford & Leaver, 1996; Rubin, 1975, 1996; Rubin & Thompson, 1994 as cited by Chamot & El – Dinary, 1999).

Both from a psychological perspective and from the perspective of a successful use of LLSs, researchers and educators alike recognize that students in the classrooms have

different learning profiles (Arnold & Fonseca, 2004) , and that teachers should provide specific ways for each individual to learn as deeply as possible, without assuming one student's road map for learning is identical to anyone else's (Tomlinson, 1999).

The objective of this project is to see whether knowing the different intelligence profiles in a classroom would be a valid indicator of the type of LLSs that should be taught to improve language learning for all the students. We believe this study could improve instructional approaches by indicating the relation between Multiple Intelligences (MI) and LLSs, and we think the role of teachers should be to explore different LLSs to test their effectiveness. As Chamot stated (2005): "language educators and methodologists will continue their quest for more effective instructional approaches and, with the increasing emphasis on learner-centered instruction and learner empowerment in all areas of education, instruction in LLSs will assume a greater role in teacher preparation and curriculum design" (126).

This paper is divided in different sections. In the first section, Gardner's MI Theory and LLSs are presented, and some previous work in this area is analyzed. Then, we present our research questions and hypothesis. The next two sections describe the methodology followed and summarize the results of this paper and, finally, in the last section, we discuss the theoretical and pedagogical implications of the findings and the limitations of the present study.

II. Theoretical background

II.1 - Intelligence and Multiple Intelligences

During the last 100 years the term intelligence has been subject to a debate among psychologists who have not been able to reach an agreement on a definition. While some of them have considered it to be a single and monolithic ability, others have referred to intelligence as a joint of different skills and talents. Spearman (1927) considered intelligence, or what he termed the g-factor, to be a general cognitive ability that could be measured and numerically expressed through an IQ. Sharing this idea of the oneness of intelligence, Oller (1978) linked the concept of intelligence to language, establishing that Spearman's "g" and language proficiency were virtually equivalent. What IQ tests actually measured, according to Oller, was L1 proficiency. Intelligence for him was the same as linguistic level and, thus, an acquired ability or construct.

Refuting Oller's theory, Carroll (1997) claimed that although the correlation of general intelligence "g" with verbal ability would probably be high, it would be far from perfect because mental development could also be expressed in other ways not related to language.

Before Carroll, Thurstone (1938) had already established that instead of a single, general ability, intelligence was the sum of seven different primary mental abilities: verbal comprehension, reasoning, perceptual speed, numerical ability, word fluency, associative memory and spatial visualization. According to Bisquerra (2003), Thurstone´s hypothesis could be the primitive antecedent of the MIT developed by Gardner (1993), who considered intelligence as the combination of different talents, influenced partly by genetics and partly by the culture in which a person has grown up.

With this concept of intelligence, Gardner distanced himself from the monolithic views of intelligence of Spearman (1927) and Oller (1978), establishing that human beings have eight types of intelligences[1] classified as naturalistic, interpersonal, logical-mathematical, visual-spatial, intrapersonal, bodily-kinesthetic, musical-rhythmic, verbal-linguistic and existential. None of them was superior to the others and each could be autonomous, changeable, and trainable (Armstrong, 1999). Gardner defined the different types of intelligences as having the following characteristics:

Naturalistic intelligence

People with a remarkable Naturalistic intelligence will easily learn how to distinguish, classify and use the elements of the environment. They will observe, experiment, reflect and make questions. Doctors, veterinarians, and zoologists for example, will show this type of intelligence.

Interpersonal intelligence

This intelligence has to do with the ability to understand other people's feelings and the sensibility to capture even what is not said like gestures or manners. Therapists, mediators, leaders, politicians, educators, sales-people, psychologists and coaches will have a highly developed interpersonal intelligence.

Logical-mathematical intelligence

It consists mainly in the capacity to analyze problems logically, carry out mathematical operations and investigate issues scientifically. In Gardner's words "it entails the ability to detect patterns, reason deductively and think logically" (1983). This intelligence is most often associated with scientific and mathematical thinking and scientists, engineers, computer experts, researchers and bankers are good examples of logical – mathematical intelligence.

[1] Gardner did not include existential intelligence in his classification. Though he considered the signs to determine whether it could qualify as an intelligence, – and he argued that it 'scores reasonably well on the criteria' (Gardner 1999:64), empirical evidence was sparse and Gardner was not willing to add it to the list. 'I find the phenomenon perplexing enough and the distance from the other intelligences vast enough to dictate prudence – at least for now' (ibid.66).

Visual-spatial intelligence

This type of intelligence includes the ability to interpret and create visual images, to understand relationships between images and meanings, and between space and effect. Designers, architects, photographers, sculptors and inventors need this type of intelligence.

Intrapersonal intelligence

Intrapersonal intelligence is directly related to the capacity of reflection and analysis about one's feelings, to the faculty of constructing an accurate image of oneself and organise and rule one's life based on it

Bodily-kinesthetic intelligence

It is shown in the ability to perform coordinated corporal movements; the skill of using the body to express feelings or ideas. It is the ability shown by people who are able to use their hands to transform elements with precision: dancers, actors, athletes, osteopaths, crafts-people, chefs and surgeons.

Musical-rhythmic intelligence

It is the faculty of perceiving, distinguishing, transforming and expressing musical forms. Musical intelligence comprehends the ability to play, compose and appreciate musical language as well as the recognition of tonal and rhythmic patterns. Musicians, singers and composers present high rates of this type of intelligence.

Verbal-linguistic intelligence

It includes the abilities to manage the spoken and written language, to use words effectively in order to reach a certain purpose. Writers, lawyers, journalists, teachers, translators or linguists would be some of the social roles associated to it.

Even though Gardner's MIT has not been readily accepted within academic psychology, it has met with a strongly positive response from many educators. According to Kornhaber (2001:276), "the theory validates educators' everyday experience: students think and learn in many different ways." Taking this premise into account, it would be desirable that teachers were aware of these personal differences among students so that they could find and work with a diversity of educational materials and methodologies to meet the multiplicity of capabilities and intelligences in the classroom. Awareness of students' different types of intelligences could be "a teacher-friendly tool for lesson planning that can increase the attractiveness of language learning tasks and therefore create favourable motivational conditions." (Arnold & Fonseca, 2004:120). Students could also be made more aware of their own learning style and, thus, develop higher interest and motivation in the learning

process. Teachers' awareness of which LLSs best fitted each student from their MI profile could also help students to optimize their learning processes and performances through explicit instruction of those LLSs.

II.2 - Language Learning Strategies

Different definitions of LLSs have been proposed by different authors. For example Rubin (1987:29) defined them as "the process by which information is obtained, stored, retrieved, and used" and Cohen as "the conscious thoughts and behaviours used by learners with the explicit goal of improving their knowledge of a target language" (1998:68)

As with definitions, there have also been several attempts to classify LLSs. Oxford (1990) made the broadest division separating strategies into direct strategies, which dealt with "language itself in a variety of specific tasks and situations" (14) and indirect LLSs, which were used for "the general management of learning" (15). Direct LLSs included memory strategies (for storing and retrieving new information), cognitive strategies (for comprehending and producing language), and compensation strategies (for overcoming gaps in the learner's L2 knowledge). Indirect LLSs embraced metacognitive LLSs (dealing with the management and coordination of the learning process), affective strategies (concerned with the emotional regulation of second language learning), and social strategies (related to learning through interaction with others).

A different classification was proposed by O'Malley and Chamot (1990) who separated strategies into three groups: metacognitive, cognitive and social/affective. Metacognitive LLSs included "higher order executive skills that may entail planning for, monitoring or evaluating the success of a learning activity" (44), while cognitive LLSs "operated directly on incoming information, manipulating it in ways to enhance learning" (15). Social/affective strategies were concerned with the control of affect and interaction with others.

What is beyond dispute is that all classifications included at least strategies which were "more directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials," that is, cognitive strategies, and those that are connected with "the learning process, planning for learning, monitoring of comprehension or production while it is taking place and self-evaluation after the learning activities have been completed," that is, metacognitive strategies (Brown & Palinscar, 1982).

LLSs have also been defined for specific areas of language such as vocabulary learning. For example, Schmitt (1997, 2000) developed a comprehensive taxonomy of vocabulary LLSs around Oxford's (1990) by integrating several classification systems. He distinguished between discovery and consolidation strategies: the former referred

to determination (meanings of new words are discovered without other people's assistance) and social strategies, whereas the latter included social, memory, cognitive, and metacognitive strategies. The taxonomy had 40 strategies in all.

The importance of LLSs for language learning is twofold: we can learn about the learning process itself through them, and, at the same time, they can be taught to less successful language learners to help them become better language learners (Grenfell & Harris, 1999). It is remarkable that LLSs are sensitive to the learning context, but also to the learner's internal processing preferences, their different ways of learning, or, in Gardner's words, to learner's different intelligences. Some studies comparing more and less effective language students have revealed that both less and more successful students do use LLS, but the difference lies in how they use them (Chamot & El-Dinary, 1999; Khaldieh, 2000; Vandergrift, 1997a, 1997b). It would be desirable, thus, to instruct students in which strategies they should use and how they should use them.

As a first step to improve student's learning processes, we should get to know which strategies they are using, if they are using them correctly, and if those strategies are the most suitable for them. Some authors (Griffihts, 2007) have reported that teachers seem to have become aware of the importance of strategies and that this "may perhaps reflect a growing awareness of the importance of LLS in the language teaching and learning area generally" (98). Many researchers (O'Malley & Chamot, 1990; Ozeki, 2000; Carrier, 2003) have also illustrated that explicit instruction is far more effective than simply asking students to use one or more strategies. This helpful role of LLSs for language improvement has also been reported regarding vocabulary learning, the language area we are going to focus on in our intervention. Fan, for example, concluded that: "the secret to vocabulary learning may include helping students see the relevance of strategy use in learning L2 vocabulary, introducing them to the strategies used often by proficient vocabulary learners and, most important, encouraging them to develop their own effective strategies for learning"(2003:14).

Taking into account, on the one hand, the proven importance of explicit instruction of L2 LLSs to help students develop their own set of effective strategies, and, on the other hand, Gardner's research showing the plurality of human cognitive ability and establishing that not everybody learns in the same way, it could be interesting to find out whether Gardner´s cognitive styles have any correspondence with the LLSs used. Armstrong (1999) stated that every kind of MI has an appropriate range of teaching strategies, and we think that by extension, also of LLSs.

II.3 - Literature review

Akbari and Hosseini (2008) already addressed the question of whether there is any relation between the MI scores of EFL learners and their use of different LLSs. The methodology they followed was to administer the MIDAS (Multiple Intelligence

Developmental Assessment Scales), SILL, and IELTS (International English Language Testing System) to ninety English major university students at BA and postgraduate levels. They concluded that their findings indicated a weak but significant relation between the two variables. However, more support in further studies and replications were deemed as necessary to determine the generalizability of the results.

This study has the aim of contributing to this area of research by analysing the relation between the different types of MI and the specific use of certain LLSs. However, it cannot be considered as a replication of Akbari and Hosseini's study (2008) because of the different methodology followed. The main differences between both studies are that neither the MIDAS to test MI, nor the IELTS were administered. Instead a shorter 40 questions test was used to test MI and no level test was considered necessary as this information could be provided by the regular exams the students held. Both tests were administered through a webpage and students completed them at home, whereas in Akbari and Hosseini's work, participants completed the paper tests in the classroom. Furthermore, this project includes an intervention while there was no intervention in their project.

Al Sulim (2012) also made an experimental study about the relation between the types of MI present in the classroom and how they were related to the key teaching techniques used. The author concluded that though all the MI types were contemplated in the teaching strategies used, teaching strategies should be reordered to adapt them to the most common types of MI present in the classroom. In line with her findings some of the suggestions she proposed were that learners should be aware of their MI and instructors should also be aware of the types of MI students have. She emphasized the need to use diverse teaching strategies to cover in the right proportion the different MI. This study is related to our work because the MI present in the classroom were also taken as the reference to decide the type of strategies teachers should work with.

Regarding the effectiveness of explicit LLS instruction for vocabulary learning and its relation to types of MI, Sagarra and Alba (2006) investigated the effectiveness of three vocabulary LLSs: rote memorization, semantic mapping and the keyword method among 778 beginning second language (L2) learners. The results revealed that vocabulary learning techniques requiring deeper processing through form and meaning associations (i.e., the keyword method) yielded the best retention, followed by rote memorization of L1 and L2 equivalents, which was more effective than creating multiple meaning associations (i.e., semantic mapping). Our study, though a replication regarding methodology, has excluded the semantic mapping LLS from the intervention as we considered more appropriate for our purposes to introduce one learning strategy that was already known and used by the students (rote memorization), and

another strategy that was new to them (the keyword method). This way we could compare the effectiveness of explicit instruction in new LLSs, our main purpose.

To formulate our hypothesis we have considered the following concepts: on the one hand, the agreement between researchers with the idea that explicit instruction is far more effective than simply asking students to use one or more strategies (Carrier, 2003; Chamot, 2004, 2005; Cohen, 1998, 2003; Graham & Harris, 2000; O'Malley & Chamot, 1990; Oxford & Leaver, 1996) and, on the other hand, the idea that deep processing strategies such as association have been found more effective in vocabulary retention than rote repetition strategies (Cohen & Aphek, 1981; O'Malley & Chamot, 1990). Our study is an attempt to clarify the effect that explicit teaching on LLSs has on vocabulary learning, and to see whether this effect is the same for all kind of MI. It is hypothesized that both strategies will produce good results in the immediate post-tests due to instruction, but that the keyword method will show better results than rote memorization in the delayed post-test, as a deep processing strategy.

III. Method

III.1 - Design

This study had a quasi-experimental design including a pre test, two immediate post tests and a delayed post test. The project´s aim was twofold; on the one hand, it tried to analyze the relation between the construct of MI and the specific use of certain LLS On the other hand, it had the double purpose of gaining a better insight into how two LLS, rote memorization and the keyword method, worked and of testing whether explicit instruction in an unknown LLS, the keyword method, was effective on medium level students when learning new L2 vocabulary.

III.2 - Participants

The study took place in the school Luis Amigo, which is located in Mutilva, province of Navarre, Spain. The 38 students who participated belonged to two intact classes of the 1st year of Senior Secondary School and were between 16 and 17 years old. The results of five of these students were disregarded due to the following reasons: one of them was an Italian girl who had not a native knowledge of the other students' L1, in this case Spanish; two of the participants were not present in all the interventions in class and the two left did not complete the LLS online test properly. Therefore, the number of participants in the study was reduced to 33.

III.3 - Instruments

Four instruments were used to collect the data:

The first data gathering tool was a webpage with two tests, a MI test and a LLSs test (SILL), which students had to complete (see Annex 1). Both tests were in the L2 (English

in this case) because the proficiency of the students was good enough and because it represented extra practice of the L2. The first test was a modification of the original MI test (Gomez Ruiz, 2012). It included five more questions than the original, so it had 40 questions instead of 35. One further type of intelligence, based on Gardner´s taxonomy, was included with the five questions, so the test analyzed eight types of intelligence instead of the seven types of the original version. Finally, the test was translated into English by the author. The SILL was used to assess LLS. The test consisted of 50 questions. In both tests, the answers were five-point Likert items from "this is not like me at all" to "I am always like this". The students completed both tests at home in order not to affect the rhythm of the classes. The purpose of using a webpage for test implementation was that it offered an attractive and motivating way of presenting the tests to students, and at the same time, the advantage of automatic scoring, thus, avoiding the human error factor in test correction. It also permitted to filter the results by gender, class or age.

The second instrument was a pre-test with 24 English words to check previous knowledge of target vocabulary. The following criteria were taken into account for the selection of the words (Sagarra & Alba, 2006):

All were words of the same length: 2 syllables.

They belonged to the same grammatical category: Nouns

They had high levels of concreteness and imageability.

They were checked with their English teacher so that the possibility of the students knowing the words was practically nil (See Annex 2).

The third instruments used were two recognition tests (immediate post-tests). Each test had 8 pairs of different words, which had been selected from the unknown vocabulary from the pre-test. These two tests were used to evaluate students' performance with the strategies of rote memorization and the keyword method. In these tests, students had to relate the target words with their corresponding picture. More pictures than words were included as distractors. (See Annexes 3 and 4)

The fourth instrument was a post-test given three weeks later than the immediate post-tests. It consisted on 16 words which students had to relate to 21 pictures. The same words and distractors as in the two previous recognition tests were used. (See Annex 5)

III.4 - Procedure

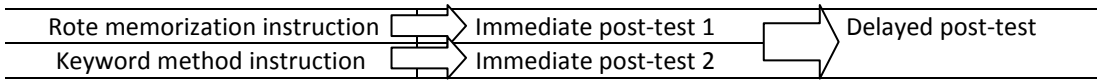
All the interventions were carried out in the regular classes, except for the tests on line, and both the L1 and the L2 were used. The former was used to explain the most difficult and abstract concepts and the L2 for easier and more concrete instructions.

The procedure was the same for both groups and the interventions took place the day of the week when both groups had English class one just after the other.

In the first session, students were explained briefly the theory of both Multiple Intelligences and LLS and were given instructions on how to proceed with the tests in the webpage. They were also told that when they finished the online tests, they would get a code they should write down and bring to class. These codes were collected and written on a list beside their names for both accountability and anonymity purposes.

In the second session, two weeks later, a vocabulary test (the pre-test) was administered. The test consisted on 24 English words to be translated into Spanish and students were given 5 minutes to complete it. 16 out of the 24 words of the pre-test had already been selected for instruction. The pre-test was done in order to check student´s previous knowledge of the target words, which were unknown to all the students according to the pre-test, and was not taken in advance to avoid making the words familiar. Students were told the results were not going to be part of their grades. The pre-test results confirmed that the words chosen for the intervention were unknown to them. Immediately after the pre-test, instruction took place. Before the instruction, students were told that they were going to see 16 English words with its Spanish translations divided in two sets of 8 words and that they would be asked to complete a recognition test after each set of words (See Fig. 1).

Fig. 1
Procedure



First, the rote memorization method was applied to the learning of new vocabulary. Students had to memorize the 8 words shown on the slides just repeating them mentally and writing them in a piece of paper. Secondly, a post-test was administered to test the effectiveness of that method. After the post-test, the keyword method was used, students were shown another set of slides with 8 different words and they had to find a Spanish word with a certain similarity, in sound or form, to the new English word. Taking these two words, the English one and the Spanish one, they had to create a sentence including both and, if possible, reinforce it with a mental image that joined both concepts and would help them in remembering the words. After the treatment, a post-test with the words selected, was administered to students.

In both strategy training exercises, each word together with its translation was projected on the board for one minute, it was read aloud by the instructor, and a sound alerted students when the next pair appeared. Just after the last pair was shown in each treatment, the students were told to place on the floor face downwards the papers they had used for both strategy training exercises. The two immediate post-

tests consisted of students seeing in a projection both lists with the 8 words they had just learnt in each treatment and the pictures representing those words, and the activity consisted in matching words and images. They had two minutes to complete each post-test. More pictures than words were introduced as distractors and the order of the words was different in the pre-test, in the two immediate post-tests, and in the delayed post-test carried out three weeks later to avoid other LLSs like memorising the order of the words interfering. Once the two immediate post-tests were finished, both the answer sheet and the rough paper were collected so that they did not have any later reference to the new words. The post-test was not announced either to prevent students from revising them (Sagarra & Alba, 2006).

Three weeks after the treatment, a delayed pos-test was administered. The test included a paper with a list of the 16 English words learnt with the two different LLSs, together with another printed sheet of paper with the 21 pictures of the two immediate post-tests (including distractors). They had 5 minutes to complete this test.

III.5 - Data and data analysis

The data to answer our first research question regarding the relationship between the use of LLSs and respondents' scores on a measure of multiple intelligences were collected from the MI and the SILL tests (See Annexes 6 and 7). The data were analyzed using SPSS. Pearson correlation coefficients between MI scores and SILL scores and between the different types of intelligences and the different types of LLSs were obtained.

The data to answer the second research question were gathered from the immediate and the delayed post tests (See Annex 8). To get four sets of results, the scores in the delayed post-test were divided into two different scores, the score obtained in the 8 English words learnt with the rote memorization, and the one obtained in the 8 words learnt with the keyword method. The four sets of results were also analyzed using SPSS. To analyse the results, the T test for related samples was applied to the results of the two immediate post tests (one following rote memorization instruction and the other the keyword method), and to the score obtained in the words taught with each method in the delayed post test scores.

IV. Results and discussion

IV. 1. Relation between MI and LLSs

Regarding the types of MI present in the sample (see Table 1), students' scores in the MI test were analysed and the type of intelligence with a higher percentage was considered the predominant intelligence of students for our analysis. Intrapersonal intelligence was the most recurrent type of intelligence (9 students), followed closely by musical (8 students), and at a distance by logical-mathematical (3), kinesthetic (3),

naturalistic (2) and interpersonal (2). Mixed types sharing the same percentage in more than one type of intelligence included two participants with intrapersonal-musical-intelligence, followed by only one participant with interpersonal-musical, another with intrapersonal-linguistic and, finally, another with logical-mathematical-intrapersonal-musical. The age of the participants might be a factor of influence in these results as they are in the adolescence period, when they are experimenting changes, making themselves many questions and having music as a means of asserting themselves, which might be a plausible explanation for the musical type of intelligence high scores.

Table 1
Predominant presence of MI by student analysis

Naturalistic	2
Interpersonal	2
Logical - Mathematical	3
Visual	1
Intrapersonal	9
Kinesthetic	3
Musical	8
Intrapersonal - Linguistic	1
Intrapersonal - Musical	2
Interpersonal - Musical	1
Logical - Mathematical - Intrapersonal - Musical	1

Regarding predominant use of LLSs (see Table 2), fewer students (11) used predominantly a direct group of LLSs than groups of indirect LLSs (20 students). A group of direct (metacognitive) and another of indirect (social) strategies were the most recurrent types of LLSs used (10 students used predominantly each group). Two other groups of direct strategies (compensation and memory) were predominantly used by 9 and two participants respectively. The remaining two students did not have any predominant group of strategies but used a mixture of them.

Table 2
Predominant use of LLSs by student analysis

Memory	2
Compensation	9
Metacognitive	10
Social	10
Compensation-Metacognitive-Affective	1
Memory-Metacognitive-Affective	1

Regarding the relation between the MI test and the SILL, the results of the MI tests showed a mean grade of 6.18 with a standard deviation of 1.7, and the SILL 5.56 with a standard deviation of 1.78 (see Table 3). The Pearson correlation coefficient showed there was moderate correlation (r= .55) between the SILL score and the MI score. This finding does not support Akbari & Hosseini's (2008) weak correlation and shows a stronger value in our sample.

Table 3

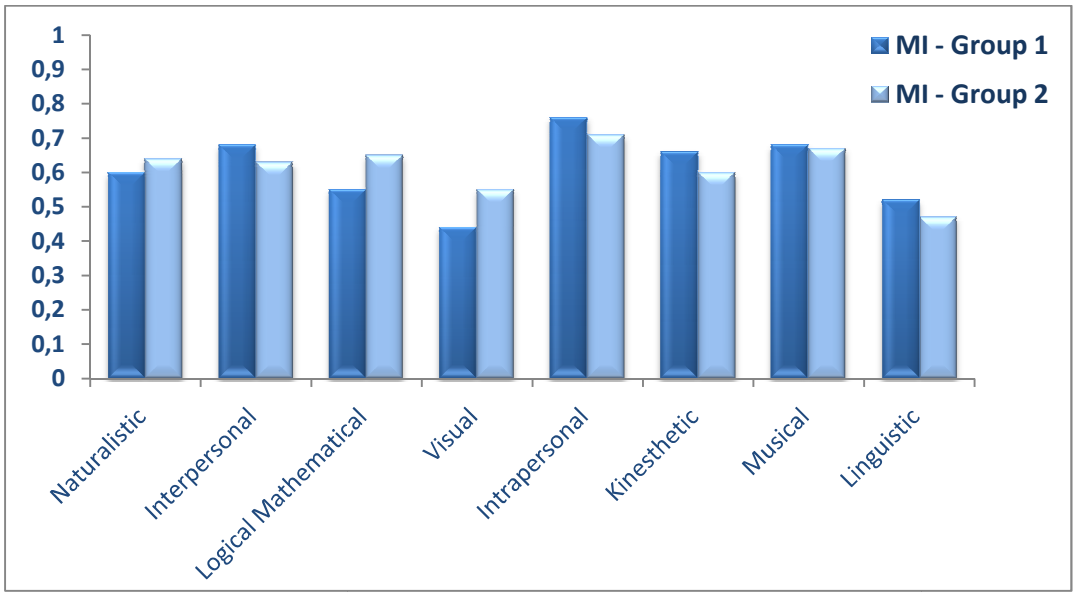
Descriptive statistics of M.I test and SILL

	N	*Minimum*	*Maximum*	*Mean*	*Standard deviation*
MI	33	1	10	6.18	1.70
LLS	33	0.80	9.60	5.56	1.76

Regarding the participants' profiles overall analysis (see Fig 2 and 3), both groups' means in MI and in LLSs were quite balanced. However, a more detailed analysis of the differences in MI showed that the results of the prevalent types of intelligence in each group matched their specialty. Group 2 (sciences) obtained higher score in naturalistic, logical-mathematical and visual intelligences, whereas group 1 (arts) had a higher score in interpersonal, intrapersonal, kinesthetic, musical and linguistic intelligences.

Fig 2

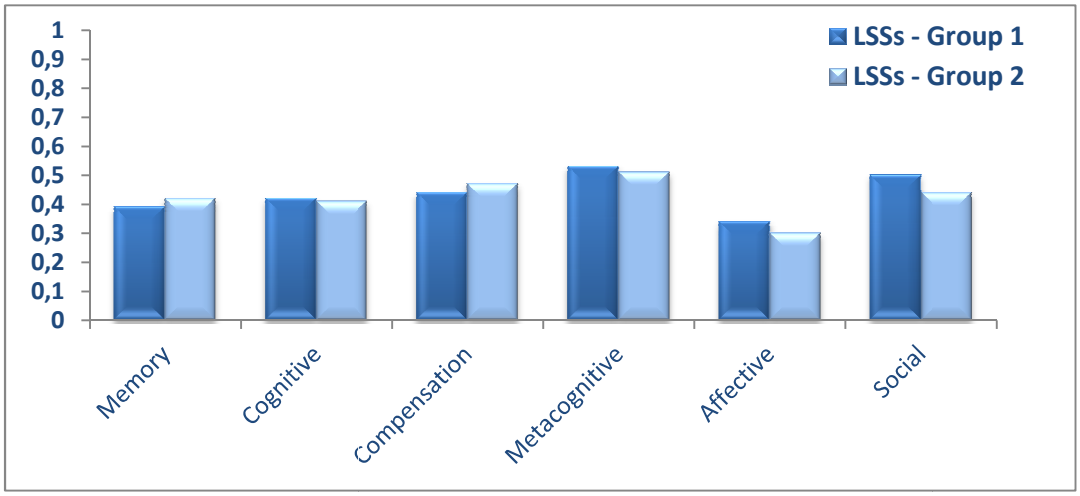
MI means



With respect to LLSs, the differences were even smaller between the two groups (see Fig 3). The most evident difference appeared analysing the two broadest groups of LLSs: direct and indirect. Group 1 used more indirect LLSs than group 2 in the three

subcategories: metacognitive, affective and social. However, the difference was not so evident in direct LLSs, where group 2 surpassed group 1 only in memory and compensation LLSs.

Fig 3
LLSs means



Analyzing the correlations between intelligences and LLSs (see Table 4), naturalistic intelligence correlated with all the groups of LLSs. Linguistic and intrapersonal intelligences correlated with five of the six groups. Interpersonal and musical correlated with three groups. Logical-mathematical correlated with only two groups, and visual and kinesthetic correlated with only one LLSs group. Regarding LLSs, indirect LLSs showed more correlations with intelligences than direct LLSs (15 correlations vs. 11) emphasizing the importance of strategies related to the control of factors external to language.

Naturalistic intelligence correlated with all the strategies, moderately with affective (r= . 401), nearly moderately with memory (r = .379) and weakly with the other four groups, metacognitive (r= .32), social (r= .31), cognitive (r= .28) and compensation (r= .21). Linguistic intelligence correlated with five groups, moderately with social (r= .496), metacognitive (r= .417), and cognitive LLSs (r= .411), and nearly moderately with affective (r= .399) and memory (r= .386). Intrapersonal intelligence also correlated with five LLSs, moderately with metacognitive (r= .527), and nearly moderately with social (r= .377), affective (r= .371) , memory (r= .371) and cognitive (r= .353). Musical and interpersonal intelligences correlated only with two groups of LLSs. Musical showed a nearly moderate correlation with social (r= .359) and a weak correlation with affective (r= .24) and metacognitive (r= .21) LLSs, while interpersonal intelligence correlated nearly moderately with metacognitive (r= . 376) and weakly with social (r= .28) and memory (r= .27) LLSs. Logical-mathematical intelligence only correlated, and weakly, with two groups of strategies, compensation (r= .28) and memory (r= .25),

and, finally, both kinesthetic and visual intelligences only correlated weakly with one group, kinesthetic with affective strategies negatively (r= . -24), and visual with memory (r= . 21).

Table 4
Correlation results of MI and different strategy types

	Naturalistic	*Interpersonal*	*Logical Mathematical*	*Visual*	*Intrapersonal*	*Kinesthetic*	*Musical*	*Linguistic*
MEMORY	0.379[b]	0.27	0.25	0.21	0.371[b]	0.17	0.16	0.386[b]
COGNITIVE	0.28	0.18	0.03	0.05	0.353[b]	0.08	0.18	0.411[b]
COMPENSATION	0.21	-0.02	0.28	-0.03	0.06	0.18	0.06	0.18
METACOGNITIVE	0.32	0.376[b]	0.05	0.04	0.527[a]	0.11	0.21	0.417[b]
AFFECTIVE	0.401[b]	0.17	0.10	-0.02	0.371[b]	-0.24	0.24	0.399[b]
SOCIAL	0.31	0.28	0.02	0.10	0.377[b]	0.17	0.359[b]	0.496[a]

[a] Two tailed, significant at 0.01
[b] Two tailed, significant at 0.05

Regarding LLSs, direct LLSs had fewer correlations and with lower values than indirect LLSs. Among the direct group, memory LLSs correlated with six of the eight intelligences, nearly moderately with naturalistic (r= . 379), intrapersonal (r= . 371) and linguistic (r= . 386) LLSs, and weakly with interpersonal (r= . 27), logical mathematical (r= . 25) and visual (r= . 21) LLSs. Cognitive LLSs had only one moderate correlation with linguistic intelligence (r= .411), one nearly moderate correlation with intrapersonal intelligence (r= 353), and a weak correlation with cognitive intelligence (r= . 28). Compensation were the LSSs with the least and lowest correlations in this group. It only correlated weakly naturalistic (r= .21) and mathematical (r= .28) intelligences.

The indirect LLSs group was more regular as each of the LLSs correlated with five intelligences and the three groups of LLSs correlated with naturalistic, intrapersonal, musical and linguistic intelligences. Metacognitive LLSs correlated almost moderately with naturalistic (r= .32) and interpersonal (r= .376) intelligences, and moderately with intrapersonal (r= .527) and linguistic intelligences (r= .417), while a weak correlation (r= .21) was established with musical intelligence. Affective LLSs correlated moderately just with naturalistic intelligence (r= .401), nearly moderately with intrapersonal (r=.371) and linguistic (r= .399), negatively and weakly with kinesthetic (r= .-24) and positively and weakly with musical (r= .24). Finally, social LLSs showed a moderate correlation with linguistic intelligence (r= .496), almost moderate correlations with naturalistic (r= .31), intrapersonal (r= .377) and musical (r= .359), and a weak correlation with interpersonal intelligence.

Some of the previous correlations could have been predicted, for example the one linking linguistic intelligence with five different LLSs. It should be expected that someone who enjoys dealing and working with language would be in contact with

language and would try to learn as much as possible when in linguistic domains and, consequently, would try to use as many strategies as possible. In fact, "language learning and use are obviously closely linked to what MI theorists label Linguistic Intelligence" (Richards & Rodgers, 2001:117).

Another quite obvious correlation is the one established between intrapersonal intelligence and all LLSs, except compensation. A person who is used to reflecting upon his/her own reactions and feelings is probably bound to have a deeper knowledge of his/her own learning process, being more conscious of the process itself and able to organise his/her own learning. This plausible explanation is supported by the nearly moderate correlation established with metacognitive LLSs.

Other correlations were not so predictable, for example the correlation between naturalistic intelligence and all LLSs. This was the only intelligence which correlated with all the LLSs though it is also true that the correlation values obtained were in general lower than the ones established with linguistic and intrapersonal intelligences. We could argue that the correlation with memory strategies could be due to the specific and scientific language type required by people with an outstanding naturalistic intelligence. Their stronger need for using memory strategies to retain specific vocabulary, more needed if the use of language has to be more exact and precise, could be the reason why they would make a greater use of this kind of strategies than other type of intelligences who only need to know general language for general purposes. Moreover, a person with a high naturalistic intelligence would observe, experiment, reflect and make questions, and this is probably why it correlated with all the LLSs as their way of learning embraces needs from all the types of strategies.

The correlations established by interpersonal intelligence could be a result of the personality features found in people with a dominant interpersonal intelligence, as they are expected to be self-assured and sociable. Musical intelligence only correlated with indirect LLSs. In fact, there are some crucial aspects closely related to music like pronunciation and intonation in language, in the same way that pitch is essential to musical language itself. It is in the relation with others, using social strategies, when pronunciation and intonation become important.

Regarding the correlations established by logical-mathematical intelligence, it should be pointed out that logic and mathematics have their own language, which is more specific and limited than general language. So the strategies studied in SILL, which focus on learning English as an L2, were not the type of strategies people with this intelligence profile would instinctively use. We could argue the same for kinesthetic and visual intelligences, with only two and one correlation respectively.

Analysing results from LLSs point of view, memory strategies were the ones with more correlations with the different intelligences. This might be due to the fact that memory strategies are the ones more spread and known among all kind of students as our educative system has traditionally been based on memorisation. Surprisingly, affective strategies correlated with five of the eight intelligences, and negatively only with kinesthetic. This might mean that the participants were aware that one's attitude and response towards L2 contexts and situations is important for the learning itself.

Social strategies correlated with the type of intelligences showing a clearer disposition to interact with others, like naturalistic, interpersonal, musical and linguistic. Metacognitive strategies obviously correlated with those intelligence types more prone to reflection and analysis, which is the case of naturalistic, interpersonal and intrapersonal intelligences. Cognitive strategies together with compensation strategies are the LLSs groups with fewer correlations. Cognitive strategies require a bigger effort on the part of the user and a more conscious use of LLSs. This could be the reason why only naturalistic, intrapersonal and linguistic intelligences showed a correlation with those LLSs. Finally the group which showed the fewest and lowest correlations was compensation LLSs. This lack of correlations might be due to the lack of knowledge of this kind of LLSs, and thus the lack of use, or to the fact that most of them are more related to language use than to language learning. In fact, Cohen (1998) asserted that compensatory strategies (often known as a form of communication strategies), which are used for speaking and writing, are intended only for language use and must not be considered language learning strategies.

IV. 2. Explicit Strategy Training

Regarding the results of the explicit training in a new type of strategy (see Table 5), the results showed that students were more successful both in the immediate and the delayed post-tests using the keyword method (9.20 and 4.02 respectively) than using the one they already knew, rote memorization (8.56 and 2.50 respectively).

Table 5
Descriptive statistics for immediate and delayed post tests

		Immediate post test		Delayed post test	
	N	*Mean*	*SD*	*Mean*	*SD*
Rote memorization	33	8.56	2.15	2.50	1.90
Keyword method	33	9.20	1.39	4.02	2.25

As it can be seen in Fig 4, the results in the immediate post test were quite high in both LLSs, and also more equal and balanced and the difference was not significant. However, in the delayed post test (Fig 5), the results were much lower and results

from the T-test confirmed that the keyword method produced significantly better results (t (1,33) = -4.030, sig = .000).

Fig 4

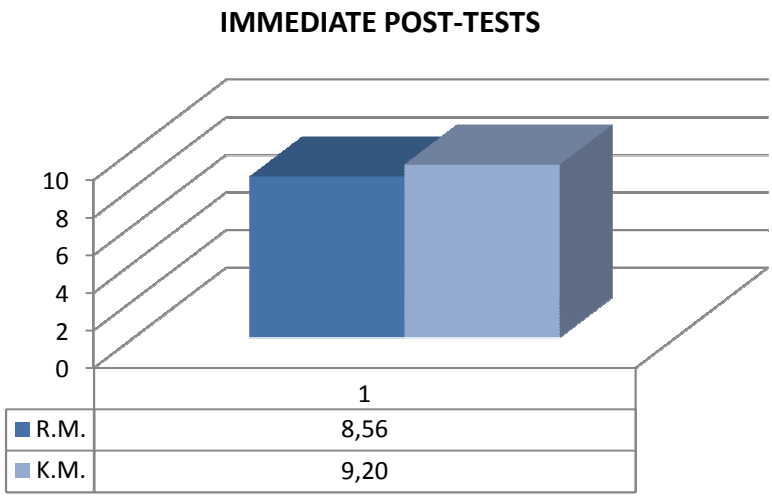
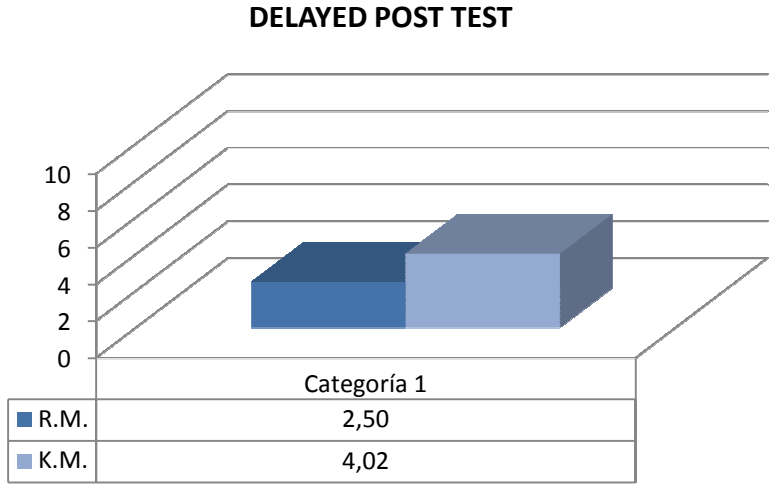


Fig 5



Means revealed that retention from the immediate to the delayed post tests decreased by 70.8% in rote memorization, and 56.3% in the keyword method, and that these differences were significant (t [1,33] = 16.729, sig = .000 and t [1,33] = 14.974, sig = .000 respectively). This should have been expected as previous research had stated that strategies involving deeper processing, such as association, are more effective in vocabulary retention than rote repetition strategies (Cohen & Aphek, 1981; Hulstijn, 1997; O'Malley & Chamot, 1990; Schmitt, 2000).

From these results we could infer that the keyword method showed to be better than the rote memorization method, especially in the long term when the difference between both strategies became more evident and significant.

Table 6
Correlation results between memory learning strategies and MI

	Naturalistic	*Interpersonal*	*Logical Mathematical*	*Visual*	*Intrapersonal*	*Kinesthetic*	*Musical*	*Linguistic*
MEMORY	.379[b]	0.27	0.25	0.21	0.371[b]	0.17	0.16	0.386[b]

We also wanted to investigate whether the results obtained from the correlation of the MI and the use of LLSs regarding memory LLSs (see Table 6) would be consistent with the results obtained through the assessment of the two memory LLSs in the post-tests. The means of the post tests grouped according to predominant intelligences in the MI test (see Table 7) were calculated to analyse this. The results showed that in most cases a higher correlation corresponded to a smaller loss of retention. That is intelligences with higher correlations with these two memory LLSs, retained more information from the immediate to the delayed post test, than those intelligences having lower correlations. Naturalistic, interpersonal and intrapersonal intelligences, which had some of the highest correlations (0.379, 0.27 and 0.371 respectively), showed as well the lowest indicators regarding loss of retention (4.68, 5 and 5.34 respectively).

Table 7
Relation between rote memorization and keyword methods in the immediate and delayed post tests with the most prominent MI scores:

	Naturalistic	*Interpersonal*	*Logical Mathematical*	*Visual*	*Intrapersonal*	*Kinesthetic*	*Musical*
Immediate p.t.	7.18	9.06	10	10	8.88	9.16	8.59
Delayed p.t.	2.50	4.06	3.75	3.75	3.54	3.12	2.81
Loss of retention In the delayed p.t.	4.68	5	6.25	6.25	5.34	6.04	5.78

VI. Conclusions

One of the purposes of this study was to investigate whether there was any correlation between MI and LLSs. Results showed a moderate correlation existed. The second objective was to assess whether LLSs instruction was effective and helped students to improve their performance. We found that instruction had positive results with memory LLSs. Furthermore, we observed that the results obtained from the intervention were consistent with the correlations between MI and memory LLSs, and that those intelligences with higher correlation values coincided with those having the best results in the delayed post-test.

Considering these results, we could infer that MI analysis in the classroom could be a valid departure point to predict the types of LLSs students would use, though a deeper analysis with a LLSs test would be recommended to have an accurate idea of the LLSs they are using. These data would provide the teacher valuable feedback in order to develop different strategies for explicit LLSs instruction, which could result in a more

effective learning for students. The teacher should decide if he/she wants, for example, to give instruction in those LLSs that are not commonly used by students and see how results relate to the different MI, or reinforce the groups of strategies students would instinctively use according to their MI profile. What it is important for instructors to have in mind is that "a given strategy is neither good nor bad; it is essentially neutral until the context of its use is thoroughly considered. What makes a strategy positive and helpful for a given learner? A strategy is useful if the following conditions are present: (a) the strategy relates well to the L2 task at hand, (b) the strategy fits the particular student's learning style preferences to one degree or another, and (c) the student employs the strategy effectively and links it with other relevant strategies. Strategies that fulfill these conditions make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations" (Oxford, 1990:8).

Though we consider the results of this study to be positive, we should be cautious as there were some factors that could limit the scope of our results, like the size of the sample. With a greater amount of participants, results would have been more reliable. Another aspect that should be improved in case of replication was the type of test used to asses MI; the one used in this study was a reduced Spanish version based on the MIDAS test. A longer and official test like the original MIDAS would be advisable to have better-defined profiles of the participants.

It would also be desirable that other LLSs apart from memory LLSs were used in the intervention to find out whether LLSs instruction would also improve results when testing other LLSs. In case of a positive result, it would also be interesting to analyse whether this improvement is related to the correlations established between the MI and the LLSs under analysis.

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VI. References

Akbari, R., Hosseini, K., 2008. Multiple intelligences and language learning strategies: Investigating possible relations. *System*, Volume 36, Issue 2, 141-155.

Al Sulim, G. H. S., 2012. Prediction of the Correlation between the Strategies of the Teaching Methods and the Multiple Intelligence of Some Graduate Female Students at Imam Mohammad Ibn Saud Islamic University. *Procedia - Social and Behavioural Sciences* 47, 1268-1275.

Armstrong, T., 1999. *7 (Seven) Kinds of Smart: Identifying And Developing Your Multiple Intelligences*. New York, Plume.

Arnold, J., Fonseca, M.C., 2004. Multiple Intelligence Theory and Foreign Language Learning: A Brain-based Perspective. *IJES*, vol. 4(1), 119-136.

Bisquerra, R., 2003. Educación emocional y competencias básicas para la vida. *Revista de Investigación Educativa*, Vol. 21, n.º 1, págs. 7-43

Brown, A. L., & Palinscar, A. S., 1982. Inducing strategies learning from texts by means of informed, self-control training. *Topics in Learning and Learning Disabilities*, 2(1), 1-17.

Carrier, K. A., 2003. Improving high school English language learners' second language listening through strategy instruction. *Bilingual Research Journal*, 27, 383-408.

Chamot, A. U., & El-Dinary, P.B., 1999. Children's learning strategies in immersion classrooms. *The Modern Language Journal*, 83, 3, 319-341.

Chamot, A. U., 2004. Issues in language learning strategy research and teaching. *Electronic Journal of Foreign language Teaching*, 1(1), 12-25.

Chamot, A. U. 2005. Language Learning Strategy Instruction: Current Issues and Research. *Annual Review of Applied Linguistics*, 25, 112-130.

Cohen, A. D., & Aphek, E., 1981. Easifying second language learning. *Studies in Second Language Learning*, 3, 221-236.

Cohen, A. D., 1998. *Strategies in learning and using a second language*. London, Longman.

Cohen, A. D., 2003. The learner's side of foreign language learning: Where do style, strategies, and tasks meet? *International Review of Applied Linguistics*, 41, 279-291.

Cuban, L., 1993. *How teachers taught. Constancy and change in American Classroom, 1890-1990*. Research on teaching series. ERIC, New York.

Fan, M. Y., 2003. Frequency of use, perceived usefulness, and actual usefulness of second language vocabulary strategies: A study of Hong Kong learners*. Modern Language Journal*, 87(2), 222-241.

Gardner, H., 1983. *Frames of Mind: The theory of Multiple Intelligences*. New York, Basic Books

Gardner, H., 2003. Multiple Intelligences After Twenty Years. Paper presented at the American Educational Research Association, Chicago, Illinois.

Gómez, E., 2012. Vocabulario en el aula de ingles de primero de la ESO mediante las inteligencias múltiples. *Re-Unir:* http://reunir.unir.net/handle/123456789/600.

Grenfell, M., & Harris, V., 1999. *Modern languages and learning strategies: In theory and practice.* London, Routledge.

Griffiths, C., 2007. Language learning strategies: students' and teachers' perceptions. *ELT Journal*, 61 (2), 91-99. doi: 10.1093/elt/ccm001.

Khaldieh, S. A., 2000. Learning strategies and writing processes of proficient vs. less-proficient learners of Arabic. *Foreign Language Annals*, 33(5), 522-533.

M. Kornhaber (2001). Palmer, Joy. ed. "Howard Gardner" in *Fifty Modern Thinkers in Education*. New York: Routledge

Navarro, D., 2006. La teoría de las inteligencias múltiples y la programación, ejecución y evaluación en la enseñanza y aprendizaje del Inglés. *Revista Pensamiento Actual*, Universidad de Costa Rica. Vol. 6, Nº 7.

O'Malley, J. M., & Chamot, A. U., 1990. *Learning strategies and achievement in the Spanish writing classroom: A case study*. Cambridge, Cambridge University Press.

Oxford, R. L., 1990. *Language learning strategies: What every teacher should know*. New York, Newbury House.

Oxford, R. L., & Leaver, B. L., 1996. A synthesis of strategy instruction for foreign language learners. In R.L. Oxford (Ed.), *Language learning strategies around the world: Cross-cultural perspectives*, 227-246. Honolulu, HI: University of Hawaii Press.

Oxford, R., 2003. Language Learning Styles and Strategies: An Overview. Oxford, *GALA*. Retrieved from web.ntpu.edu.tw.

Ozeki, N., 2000. *Listening strategy instruction for female EFL college students in Japan*. Tokyo, Macmillan Language House.

Richards, J. & Rodgers, T., 2001. *Approaches and methods in language teaching*. Cambridge University Press, Cambridge.

Rubin, J., 1987. Learner strategies: Theoretical assumptions, research history and typology. In A. Wenden & J. Rubin (Eds.), *Learner strategies in language learning*, 15-30.

Sagarra, N., & Alba, M. 2006. The Key is in the Keyword: L2 Vocabulary Learning Methods with Beginning Learners of Spanish. *The Modern Language Journal*, 90, ii, 228-246.

Vandergrift, L., 2033a. Orchestrating strategy use: Towards a model of the skilled L2 listener. Language Learning, 53, 461-494.

VII. Annexes

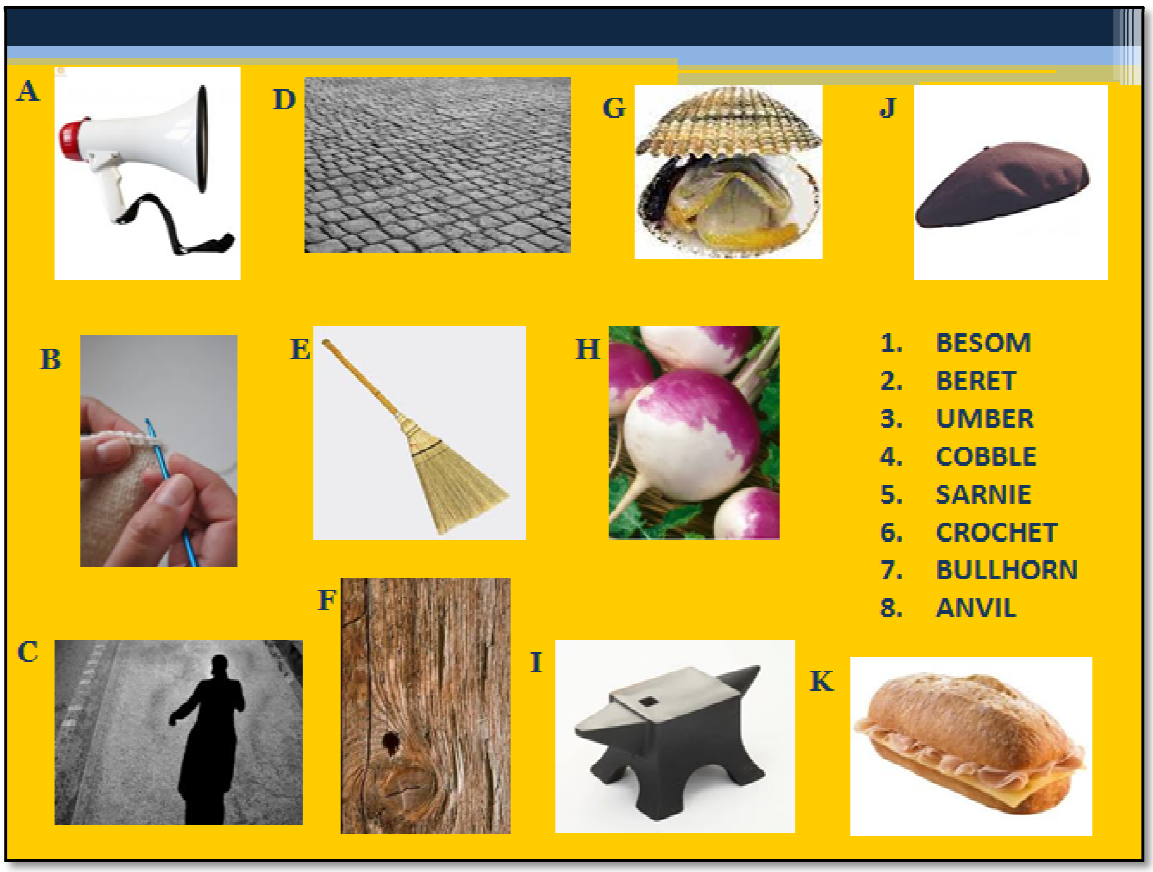
Annex 1: Webpage for the MI and LLSs tests: www.jalzueta.com/intelligences

Annex 2: List of words included in the pre-test.

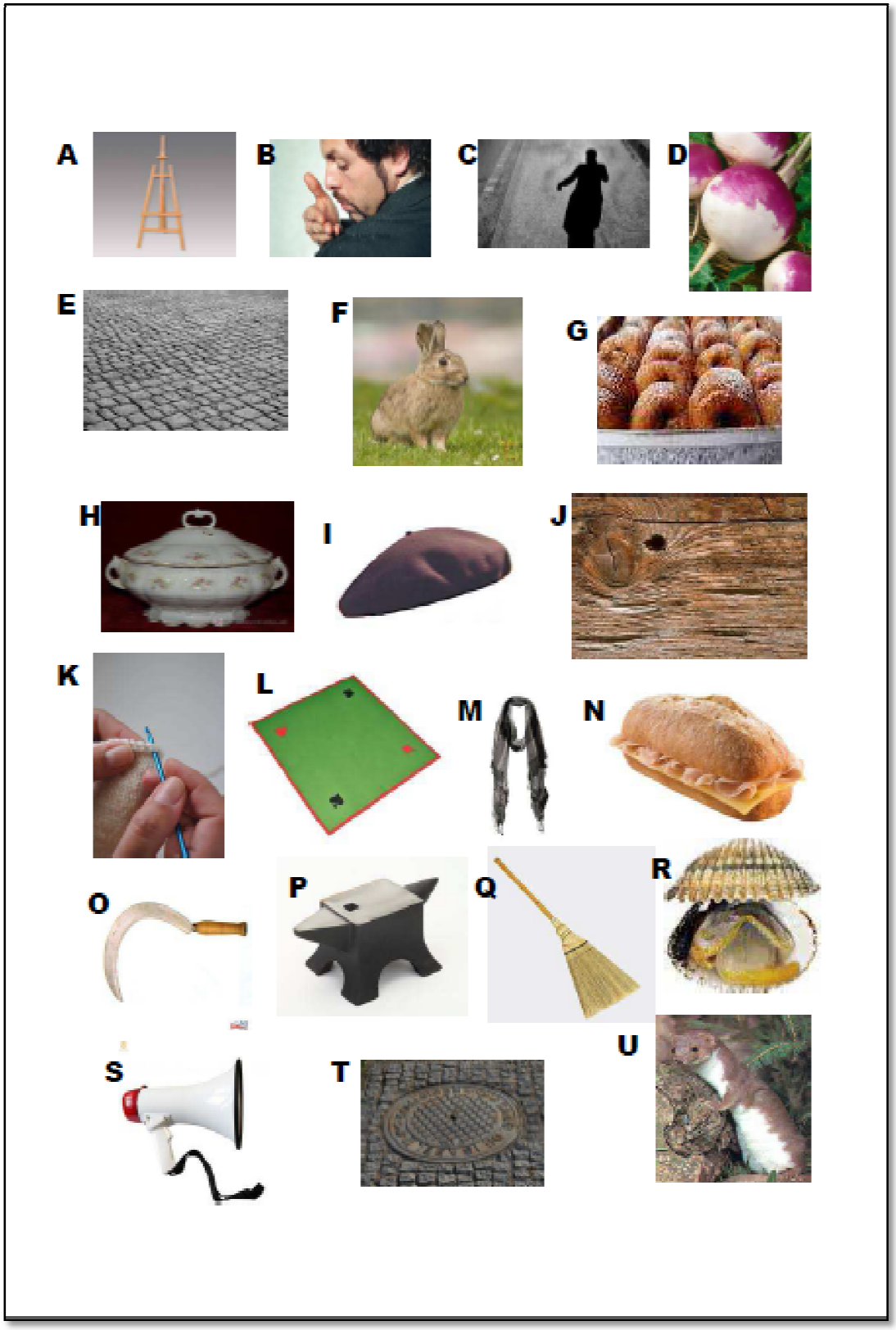
1. Anvil:	9. Crowbar:	17. Tureen:
2. Baize:	10. Cruller:	18. Trestle:
3. Beret:	11. Culvert:	19. Tinsel:
4. Besom:	12. Dandruff:	20. Tadpole:
5. Bullhorn:	13. Weasel:	21. Sickle:
6. Cobble:	14. Umber:	22. Sarnie:
7. Cockle:	15. Turnstile:	23. Maggot:
8. Crochet:	16. Turnip:	24. Mallet:

Annex 3: Rote memorization immediate post-test.

Annex 4: Keyword method immediate post-test.



Annex 5: Delayed post-test:



Annex 6: MI test scores.

	Naturalistic	Interpersonal	Logical Mathematical	Visual	Intrapersonal	Kinesthetic	Musical	Linguistic	Means
1	6	7	6,5	5	6,5	5	8,5	1	5,69
2	6,5	5,5	6	6	7	6,5	7	4,5	6,13
3	6	7	5	5	5,5	6	4,5	3	5,25
4	5	5	4	3	7,5	7	7	3,5	5,25
5	3,5	5	4	4,5	5,5	5	4	3,5	4,38
6	6	7,5	4,5	3,5	8	9,5	6	6,5	6,44
7	7	9	7	6	10	7,5	9	8	7,94
8	6	5	3,5	3,5	7	5	6,5	6,5	5,38
9	6	7,5	4,5	2	8,5	6	6	6,5	5,88
10	7,5	7,5	5,5	5,5	7,5	8,5	7,5	4	6,69
11	6,5	8	6	5,5	8,5	6	8,5	7	7,00
12	6	7	5,5	4,5	8	5,5	5,5	8	6,25
13	7	4,5	7	6	7	8	8,5	3,5	6,44
14	3,5	6,5	6	3,5	8,5	6,5	4	6	5,56
15	6	8,5	4	3	7	6	8,5	6,5	6,19
16	7	5	8,8	4	7	4,5	7	3,5	5,85
17	4	8,5	6,5	4,5	7,5	6	4	2,5	5,44
18	5,5	7,5	4,5	2,5	9,5	5,5	7,5	5	5,94
19	8,5	6	7	8,5	7	6,5	9	6,5	7,38
20	5	4,5	7,5	4,5	6	5,5	3,5	6,5	5,38
21	7,5	6	6,5	4	7	5	8,5	5	6,19
22	8	8,5	7,5	9	7,5	7,5	8,5	7	7,94
23	7,5	7	7	7	7,5	6	9,5	6,5	7,25
24	7,5	5,5	6	5,5	4,5	6	3	1,5	4,94
25	6,5	7	6,5	4,5	7	6,5	8	4	6,25
26	5	6,5	5	6,5	4	7,5	5,5	2,5	5,31
27	3	6	7,5	4	5,5	6	6	4,5	5,31
28	5,5	7	8,5	4,5	9,5	7	9	7	7,25
29	7,5	7	8,5	7,5	8,5	6,5	8,5	5,5	7,44
30	7,5	6,5	5,5	7	6,5	7,5	9	4,5	6,75
31	5,5	6	5,5	4,5	8	6	7,5	4,5	5,94
32	10	6,5	8	7	7,5	4,5	3,5	4	6,38
33	7,5	6,5	5	7	6	4,5	10	5	6,44
Means	6,27	6,61	6,07	5,11	7,21	6,26	6,92	4,95	

Annex 7: LLSs test scores.

	MEMORY	COGNITIVE	COMPENSATION	METACOGNITIVE	AFFECTIVE	SOCIAL	Means
1	3,6	2,1	2,9	4,2	2,9	3,3	3,33
2	2,2	2	2,5	3,3	1,7	2,1	2,63
3	2,2	3,8	5,4	4,4	2,1	2,5	3,90
4	2,8	3,4	4,2	3,9	2,9	5	4,37
5	4,4	4,1	2,9	2,2	2,1	2,1	3,80
6	5,3	5,4	6,3	5,6	2,1	6,7	6,23
7	6,7	7	5,4	8,9	6,3	9,6	8,48
8	4,4	6,8	5,4	7,5	5	6,7	7,30
9	4,4	4,1	5	5	5	2,5	5,83
10	5,3	4,3	5,4	7,8	4,2	5,8	7,13
11	4,4	5,4	4,6	7,8	5,8	8,8	7,97
12	5	6,6	4,2	8,1	5	8,8	8,28
13	3,9	5,2	5,4	4,4	4,2	4,6	6,78
14	1,7	2,3	3,8	5,6	2,1	3,8	5,55
15	4,7	4,5	5	5	5,4	7,1	7,78
16	3,9	4,1	6,3	3,1	4,2	4,6	7,03
17	4,7	5,2	5,4	5,6	2,9	4,2	7,50
18	4,4	4,8	2,9	6,1	2,1	5	7,22
19	6,4	5,9	5,8	6,4	4,6	6,7	9,13
20	4,7	3,2	6,3	3,6	3,3	4,6	7,62
21	2,8	3,8	5,8	4,4	2,9	4,2	7,48
22	3,3	1,4	2,1	1,1	0,8	1,3	5,33
23	6,7	7,1	6,3	8,3	5,4	9,2	11,00
24	4,2	4,6	4,6	5	2,9	5,4	8,45
25	3,6	4,1	5,8	6,4	4,2	4,6	8,95
26	2,8	2,5	5,4	3,1	0,8	2,9	7,25
27	3,3	3	3,8	3,3	2,5	2,5	7,57
28	6,1	5,7	7,1	6,7	2,9	5,8	10,38
29	4,4	5,5	5,4	6,9	3,3	6,3	10,13
30	5,8	5,7	5	6,4	2,5	8,3	10,62
31	3,3	1,6	2,9	3,3	3,3	1,7	7,85
32	6,4	4,8	5	7,2	5,8	4,2	10,90
33	2,2	3,4	4,2	4,2	3,8	4,6	9,23
Means	4,24	4,35	4,80	5,30	3,48	5,02	

Annex 8: Immediate and delayed post-tests results in the rote memorization and keyword method LLSs.

	RM 1	RM 2	KM 1	KM2
1	3,75	1,25	10	2,5
2	6,25	2,5	10	2,5
3	10	3,75	10	8,75
4	3,75	0	8,75	5
5	10	6,25	8,75	5
6	10	1,25	10	2,5
7	10	5	10	7,5
8	8,75	6,25	10	7,5
9	6,25	1,25	10	6,25
10	10	5	10	6,25
11	10	3,75	10	8,75
12	5	1,25	10	2,5
13	10	3,75	10	2,5
14	7,5	0	10	3,75
15	10	2,5	10	5
16	10	2,5	10	6,25
17	10	1,25	6,25	2,5
18	10	2,5	7,5	1,25
19	6,25	2,5	3,75	0
20	10	2,5	10	1,25
21	10	2,5	10	5
22	10	3,75	10	2,5
23	10	5	8,75	3,75
24	3,75	0	8,75	5
25	10	0	8,75	1,25
26	7,5	1,25	7,5	2,5
27	10	5	10	5
28	10	0	8,75	1,25
29	8,75	1,25	8,75	2,5
30	8,75	5	7,5	5
31	10	0	10	5
32	6,25	1,25	10	3,75
33	10	2,5	10	2,5
Means	8,56	2,50	9,20	4,02